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Contents

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WOOD'S ROTARY CUTTER
MAKES CHAFF OF POTATO VINES

Clean cutting of potato vines and weed growth on this 35 acre field near Aquebogue, N. Y. is watched approvingly by owner, Victor Prusinowski, at right. Wood's Rotary Cutter, operated by Vic, Jr. is causing vines and weeds to literally disappear. John Burgess (left), salesman for Fanning & Housner, Riverhead, N.Y. took one look and asked "Where did it go?" Wood's Model 50 Rotary Cutter cut it for easier harvesting.

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OLD AND NEW POTATO VARIETIES

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The number of potato varieties being grown in the United States is increasing year after year. According to a summary of certified seed potato production prepared by the Bureau of Agricultural Economics, United States Department of Agriculture, 51 varieties are found in the certified lists for 1948. Twenty of these are old varieties that were produced during the last half of the nineteenth century. The other 31 are comparatively new, since they were distributed to growers during the last 17 years as will be noted from tables 1 and 2. The old varieties make up approximately 56 per cent of the total certified seed and the new 44 per cent.

Thirteen varieties (7 old and 6 new) constitute about 96 per cent of the total. They rank as follows: Katahdin, 27.56 per cent; Irish Cobbler, 15.47; Triumph, 13.31; White Rose, 8.79; Russet Burbank, 7.14; Chippewa, 7.10; Green Mountain, 6.85; Sebago, 3.12; Red Mc-

[1]Principal Geneticist.

Clure, 2.12; Pontiac, 1.93; Red Warba, 1.02; Dakota Chief, 1.02; and Russet Rural, 1.01.

Twenty-seven of the new varieties were produced by crossing and selection. The other four were the result of bud mutations or sports. In every case these were color mutations: The Red Warba from Warba; the Dakota Chief and White Pontiac from Pontiac; and the Russet Sebago from Sebago. The Red Warba is a red-skin variety, in contrast to the Warba, which has a white skin and pink eyes. The Dakota Chief, sometimes called the Red Pontiac, is supposed to have a deeper red skin color than the original Pontiac, whereas the White Pontiac resulted from the loss of the red color of the parent variety. The Russet Sebago, as the name implies, has a russet skin, in contrast to the smooth white skin of the original Sebago. No other changes are claimed for the new selections except for Russet Sebago which may be somewhat more scab-resistant than the white-skin Sebago.

TABLE 1.—*Old varieties on the certified seed-potato list in* 1948.

Variety	Specific Gravity (Maine, 1948)	Production	Relative Production	State with Greatest Production	Other States Producing
		Bu.	Per cent		No.
Irish Cobbler	1.085	7,513,998	15.47	Minnesota	16
Triumph	1.079	6,464,320	13.31	North Dakota	17
White Rose		4,269,265	8.79	California	12
Russet Burbank		3,466,162	7.14	Idaho	12
Green Mountain	1.084	3,326,721	6.85	Maine	7
Red McClure		1,029,900	2.12	Colorado	0
Russet Rural		489,836	1.01	Michigan	6
Early Ohio		284,389	.59	Minnesota	3
Burbank		47,776	.10	Oregon	2
Rural		42,005	.09	New York	5
Columbia Russet		25,000	.05	North Dakota	0
Brown Beauty		20,070	.04	Colorado	0
Earliest of All		7,000	.02	Oregon	0
Sir Walter Raleigh		2,034	.004	Pennsylvania	0
British Queen		1,850	.004	Oregon	1
Gold Coin		1,833	.004	Oregon	1
Early Rose		1,642	.003	Oregon	1
Beauty of Hebron		967	.002	Oregon	1
Idaho Rural		270	—	Idaho	0
Dakota Red		130	.03	Maryland	0
Unclassified		16,326	55.60	Minnesota	2
Total for old varieties		26,995,168			
Total production for all varieties for United States		48,575,155			

TABLE 2.—*New varieties on the certified seed-potato list in* 1948.

Variety	Specific Gravity (Maine, 1948)	Production	Relative Production	State with Greatest Production	Other States Producing
		Bus.	Per cent		No.
Katahdin	1.084	13,385,278	27.56	Maine	15
Chippewa	1.079	3,448,755	7.10	Maine	10
Sebago	1.082	1,517,345	3.12	Maine	14
Pontiac	1.077	937,252	1.93	North Dakota	11
Dakota Chief		497,494	1.02	North Dakota	2
Red Warba	1.080	493,205	1.02	Minnesota	6
Calrose	1.075	412,447	.85	California	2
Teton	1.085	220,613	.45	Pennsylvania	5
Sequoia	1.073	177,838	.37	North Carolina	10
Mohawk	1.086	94,366	.19	Maine	1
Houma	1.083	94,310	.19	Maine	3
Ontario	1.079	78,380	.16	New York	4
Warba		36,934	.08	Minnesota	3
Essex	1.074	31,537	.06	New York	2
La Salle	1.087	23,750	.05	North Dakota	1
Pawnee	1.084	21,272	.04	Colorado	2
Progress		19,718	.04	Nebraska	0
Russet Sebago		17,400	.04	Wisconsin	0
Erie	1.080	16,058	.03	Pennsylvania	1
Waseca		9,212	.02	Minnesota	0
Menominee	1.083	8,040	.02	Michigan	2
Satapa		7,097	.01	Minnesota	0
Kasota	1.077	6,003	.01	Montana	2
Chisago		2,727	.01	Minnesota	0
Chenango	1.081	2,500	.01	New York	0
Canus	1.071	2,500	.01	North Dakota	0
Marygold	1.079	640	—	Maryland	0
Empire	1.081	600	—	New York	1
Kennebec	1.086	200	—	Maryland	0
Potomac		150	—	Maryland	0
White Pontiac		40	—	Maryland	0
Total for new varieties		21,563,661	44.39		
Total production for all varieties for the United States		48,575,155			

Among the old varieties the Irish Cobbler was more widely grown than any other variety in the United States. In recent years it has been replaced in a number of sections by Katahdin and Chippewa. These varieties are not so early as the Cobbler, but they usually outyield it, and they are superior to it in market quality. The Triumph is an early red variety that is grown rather extensively in the Middle West but has

been replaced in parts of Florida, Alabama, and Louisiana by Sebago and Katahdin.

The Russet Rural is still quite widely grown in Michigan but is not so important as it once was in such states as Pennsylvania and New York. The Rural (Smooth Rural, White Rural) seems to be on its way out since only 42,000 bushels of certified seed of this variety was produced in 1948. It is very susceptible to *Fusarium eumartii*, or Z disease, and to yellow dwarf. It has been replaced in parts of New York State and Wisconsin by Sebago which has a degree of resistance to both of these diseases. The Katahdin and Chippewa have also made inroads into Rural territory.

The White Rose predominates in the early-potato districts of California. It has been grown commercially at one time or other in other sections of the country but under different names. It was grown as the Jersey Giant in New Jersey, the Aroostook Wonder in Maine, and the American Giant in several states. It was replaced in these states by other varieties because of its tendency to produce under unfavorable conditions, knobby and hollow-heart tubers.

Green Mountain is still one of the leading varieties for yield and cooking quality if grown under the most favorable conditions, but it is highly susceptible to nearly all the potato diseases, especially late blight, mild mosaic, leaf roll and net necrosis. It has been replaced in some sections of Maine by Katahdin and Chippewa.

Russet Burbank (Netted Gem, California Russet, Idaho Baker) is the most extensively grown variety in Idaho and other states in the Pacific Northwest. When grown in sections to which it is adapted, its tubers have a high dry-matter content, which is preferred by most people for baking purposes. In recent years it has been attacked by a number of diseases that have reduced the yields and lowered the market quality. Among these are leafroll, which may or may not be the same as the virus leafroll of the Northeast, and a so-called die-early disease, which has not been definitely identified. This malady is thought by some to be caused by a species of Fusarium; others are of the opinion that Verticillium is the cause of the trouble.

Red McClure is grown for the most part in the San Luis Valley of Colorado. It seems to be well adapted to that section, and when graded carefully and washed, it usually brings a premium price on the Chicago markets.

To judge by the amount of certified seed produced in 1948, the other old varieties, with the possible exception of the Early Ohio, are grown to a very limited extent. The present status of the Dakota Red

is worthy of note. Not many years ago this variety was grown rather extensively under the name Red Skin or Jersey Red Skin in New Jersey, and for a fall crop on the Eastern Shore of Maryland and Virginia. It has been almost entirely replaced by the newer varieties, and as a result only 130 bushels of certified seed are available for the 1949 crop. McCormick and Spaulding Rose were quite widely grown at one time or other. They are no longer found on the certified seed lists. It is apparent that while new varieties are being introduced and increased, some of the old ones are on the way out as shown in table 1.

Some of the old standard varieties have excelled in yield and quality, but they have been very susceptible to diseases and insects. The new varieties are the result of research that has had for its objective combining the yielding ability and market and cooking quality of the old varieties with resistance to diseases and insects. The potato-breeding program of the United States Department of Agriculture began in 1910. In 1929 it was reorganized as the National Potato-Breeding Program, cooperating with a number of state experiment stations, some of which had potato-breeding programs of their own. Interest in the work increased until, in 1948, more than 35 state experiment stations were engaged to a greater or less degree in the enterprise. In that year increased appropriations made possible further expansion, and now a program exists that is truly national, as it is organized in every potato-growing section of the United States.

Katahdin was the first variety distributed under the present program. It was bred for resistance to mild mosaic. It has since shown some resistance to leafroll and is immune to net necrosis. Its adaptability is shown by the fact that, although it was not distributed until 1932, it now holds first place among all varieties grown in the United States. For a number of years the Irish Cobbler held first place in the amount of certified seed produced but it was displaced by Katahdin in 1947, and a year later nearly 28 per cent of all the certified seed produced was of the Katahdin variety (table 2). In addition, more than 5 million bushels of certified Katahdin were produced in the Maritime Provinces of Canada, which is about 45 per cent of all certified seed grown in those three Provinces. Its popularity is due to its wide adaptation, disease resistance, and excellent market quality.

Chippewa was released in 1933. It has not increased so rapidly as Katahdin. However, it did surpass Green Mountain in 1948. Chippewa, in the field, is immune to mild mosaic but very susceptible to leaf roll. It is a more consistent yielder than Green Mountain and matures from 10 days to 2 weeks earlier. In addition, Chippewa does not contract net

necrosis, the disease that is for the most part responsible for the decline of Green Mountain.

Sebago was released in 1938, not because it was perfect but because it had the best combination of characters available at the time. It produces high yields of tubers with satisfactory market and cooking qualities. It is more resistant to late blight than any of the old commercial varieties, although not nearly so resistant as some of the varieties released within the past 4 years. One of the most valuable characters observed so far is that its tubers are resistant to rots initiated by the late-blight fungus. It is more resistant to scab than Irish Cobbler or Green Mountain. Sebago is immune from mild mosaic in the field, and up to the present time its tubers have not developed net necrosis as a result of infection with the leaf-roll virus. Tests in the Hastings district of Florida have shown it to be resistant to brown rot, and it is grown in parts of New York state and Wisconsin becouse it is more resistant to yellow dwarf than Rural. There are about 1½ million bushels of certified Sebago in the United States, as you have observed in table 2, and nearly as much more in the Maritime Provinces of Canada.

Russet Sebago, a sport of Sebago, was selected and is being increased in Wisconsin. It is reported to be more scab-resistant than the original Sebago.

Houma was a United States Department of Agriculture selection sent to various experiment stations for test. It was selected in Louisiana because it gave a satisfactory performance in the Houma district of that state. However, it was found to be very susceptible to early and late blight, and although it still produces satisfactory yields other varieties are preferred in Louisiana. It is resistant to mild mosaic and is probably more resistant to leafroll than any of the varieties grown commercially at present. It has been grown to some extent in the New England section. About 94 thousand bushels of certified seed were produced in 1948, most of it in Maine as shown in table 2.

Sequoia was introduced in North Carolina because of its superior yields in the western part of that state. It was selected because of its resistance to hopperburn, and although thousands of seedlings and varieties have been tested for this character since Sequoia was released, none of them, so far, has shown the combination of high yield, good quality, and resistance to leafhopper injury found in Sequoia. It shows some resistance also to flea beetle injury. Its vines are moderately resistant to late blight, but its tubers are very susceptible to rot initiated by the late-blight fungus. About 178 thousand bushels of certified seed

of Sequoia were grown in 1948, with North Carolina showing the largest production.

Pontiac and its mutant variety Dakota Chief, or Red Pontiac, are late high-yielding red varieties. Pontiac was released in Michigan because it produced high yields on the muck soils of that state. It outyields and has a higher market quality than Triumph in Florida. Dakota Chief has been increased in North Dakota. In any district where a late red-tuber high-yielding variety can be grown these varieties should meet the requirements.

Kasota, a light red variety, was released jointly by Nebraska and Minnesota because of its tolerance to fusarium wilt, which is a destructive disease in some sections of the Middle West. Favorable reports have come from Nebraska and Minnesota, but the state reporting the largest amount of certified seed is Montana.

Menominee and Ontario originated from the same cross. They were both United States Department of Agriculture seedlings and were tested first at Presque Isle, Maine. They were bred for scab resistance and sent with a number of others to 20 cooperating states for further tests of their scab resistance and adaptation. Michigan Agricultural Experiment Station selected Menominee from the group, and the Cornell Station selected Ontario. They are both highly resistant to scab and somewhat resistant to late blight. In comparative tests, Ontario usually yields more and produces a smoother tuber, especially if the tubers are large. They are recommended for conditions in which a late variety can be used and in which scab is a limiting factor in the production of susceptible varieties.

Calrose is a late variety that was produced in Maine but sent to California because of its moderate resistance to late blight. It is a very high yielder, especially under irrigation where liberal amounts of water can be supplied.

Teton originated in Maine as a United States Department of Agriculture seedling. It was sent to several states for trial. It was found to be resistant to ring rot in tests in Wyoming and Maine. It was released from Wyoming but Pennsylvania has at present most of the certified seed of this variety. It is not immune from ring rot, and some experimental station people are reluctant to recommend it to their growers; but so far it has given excellent results in Pennsylvania.

Erie is a full sister of Teton. It was released in Ohio where it has been grown in a limited area. The largest production of this variety is in Pennsylvania. It is more resistant to ring rot than Katahdin or Green Mountain but not so resistant as Teton.

Mohawk is a United States Department of Agriculture seedling that was selected at the Cornell University Agricultural Experiment Station because of its high market and cooking quality. It was released to fill a demand for higher cooking quality in potatoes. Its production has not increased in New York State, but is increasing in Maine. It would have increased much more rapidly in the latter state except for the fact that it was not immune from net necrosis as it was first thought. As grown in parts of New York State and in Maine it produces tubers with excellent quality for baking.

Essex, Chenango, and Empire are varieties bred and released by the Cornell Station. They are highly resistant to late blight, but not immune as the early tests seemed to indicate. The Cornell Station has released nine others but none of them is found on the certified lists for 1948.

La Salle is an early white-tuber potato introduced by the Louisiana Agricultural Experiment Station. It produces tubers with somewhat better market quality than that of the Irish Cobbler, with which it was supposed to compete; but so far the La Salle has not replaced the Cobbler to any great extent, as can be seen by comparing the amount of certified seed of the two varieties.

Pawnee was released from the Potato Experiment Station of the United States Department of Agriculture, Greeley, Colo. In that district it gives satisfactory yields of high-quality potatoes. It is medium early but very susceptible to scab.

Progress is a red variety released in 1948 by the Nebraska Agricultural Experiment Station. Its chief advantage over Triumph is that its tubers do not crack in the harvesting operations so readily as do those of Triumph.

Waseca, Satapa, and Chisago are three varieties bred and released by the Minnesota Agricultural Experiment Station. There is a small amount of certified seed of each of these in Minnesota, but they are too new to predict how widely they will be grown.

Canus is the name given to a United States Department of Agriculture seedling that was sent to Canada a number of years ago in exchange for some varieties and seedlings from that country. The name is a word combining "Can" for Canada with "us" for United States. Canus has been promising in tests in Alberta and other sections of Canada.

Marygold and Potomac were United States Department of Agriculture seedlings released by the Maryland Agricultural Experiment Station. Marygold has outyielded Irish Cobbler in the spring-planted crops of the Eastern Shore of Maryland and Dakota Red in the fall crops of

the same district. It was put out to fill a need for one variety that would produce well in the spring crop, could be harvested in the summer, its tubers treated to break the rest period, and replanted immediately. So far, not enough seed of this variety has been produced to make it possible to determine whether or not it will meet the requirements of both crops when produced on a commercial scale. Potomac was released in the western section of Maryland where it has consistently outyielded the Rurals and Sebago but not the Sequoia. It is somewhat resistant to late blight in both vines and tubers, which gives it an advantage over Sequoia, the tubers of which are very susceptible to blight rot. However, Potomac has not been increased, as can be seen by the very small production of certified seed in 1948 as shown in table 2.

White Pontiac, a color mutation of the Pontiac, was selected and released by the Maryland Agricultural Experiment Station. It will probably produce high yields like the parent variety but will no doubt be susceptible to all the common diseases. For this reason it is difficult to see how it can compete with the high-yielding disease-resistant white varieties that are already in commercial production.

Kennebec was released by the United States Department of Agriculture and the Maine Agricultural Experiment Station. It is immune from the common forms of late blight in Maine and has shown a high degree of resistance in many tests throughout the United States. It has wide adaptation, as is shown by reports from South Africa, New Zealand, England, and Uruguay. Excellent yields have been reported, the only complaint being that the potatoes grow too large. However, the size can be controlled by closer planting or by using less fertilizer. The cooking quality of the tubers from the Maine plots has been rated from good to excellent. A degree of resistance to scab has been reported, but this is probably no greater than that found in Sebago; it was not bred for scab resistance. So far, it has never contracted mild mosaic or net necrosis. It is susceptible to leaf roll and spindle tuber, but no more so than Sebago and most of the other commercial varieties. As shown in table 2, only 200 bushels of this variety appear on the certified seed lists. There are several thousand bushels in Maine but it is in the hands of foundation seed growers who will increase it again before putting it on the open market. There should be seed available in the fall of 1949.

No variety has been distributed to growers that will meet the needs of all the cooperating states, and it is doubtful whether such an ideal variety will be produced soon. However, there was a sectional demand for most of the new varieties and their production has increased against hard competition because of special characters that give them a definite

advantage over the old varieties. In some of the new varieties the important objective for which they were bred has been reached. Kennebec, Sebago, Empire, Essex, and Chenango are resistant to late blight. Menominee and Ontario are resistant to common scab. Katahdin, Chippewa, Houma, Sebago, Kennebec, Mohawk, Ontario, and Menominee are resistant to one or more virus diseases; and Teton is resistant to ring rot.

A beginning has been made, and the new varieties that have already been released have been a factor in increasing the yields of potatoes in the United States from a little over 100 bushels an acre 25 years ago to more than 200 bushels in 1948. The results indicate much greater possibilities in breeding. We have available a large number of important characters that have not yet been combined in one variety, and each new combination should give us a new variety more valuable to some of the growers than any we now have. Those characters include wide adaptation; early, medium, and late maturity; smooth desirable shapes; shallow eyes; high yielding ability; high dry-matter content; and excellent cooking quality. Besides, we have seedlings that resist one or more of the following diseases and insects: mild mosaic, latent mosaic, rugose mosaic, leaf roll, net necrosis, yellow dwarf, late blight of the vines, tuber rot initiated by the late blight fungus, common scab, potato wart, brown rot, ring rot, hopperburn, flea beetle injury, and aphid injury. Such characters promise much for the varieties of the future.

POTATO VARIETY TESTING AND RELEASE PROGRAM IN MAINE

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An attempt has been made in Maine to develop a coordinated, systematic plan for potato variety development, testing, increase, and release. Such a plan has as its ultimate objective the orderly release to commercial certified seed potato growers of superior potato varieties with low initial virus disease readings. Several agencies are involved in this cooperative plan, namely: the Bureau of Plant Industry of the

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[2]Horticulturist.

United States Department of Agriculture; the departments of Plant Pathology, Entomology, and Agronomy of the Maine Agricultural Experiment Station; and the Division of Plant Industry of the Maine Department of Agriculture. All agencies involved in this program have agreed upon certain areas of responsibility. Based on three years' experience it appears that the program is functioning effectively.

Varietal Development

Operating at Beltsville, Maryland. geneticists with the Bureau of Plant Industry, Soils and Agricultural Engineering of the United States Department of Agriculture carry the responsibility for developing new potato varieties. While this breeding program is national in scope, the particular needs of the Maine potato industry receive recognition as do the needs of other producing areas. Seedlings produced at Beltsville are planted on the Maine Agricultural Experiment Station farm in Chapman, under the supervision of personnel of the Bureau of Plant Industry. Annually, about 20,000 first-year seedlings are grown on the Chapman farm in single hill lots. Observations are made during the growing season and at harvest time on plant and tuber characteristics with a special effort being made to retain those seedlings which have commercial possibilities or represent potentially desirable parent stock. At the end of this first year only about ten to fifteen per cent of the seedlings are saved. In the second year the seedlings which have been saved are grown in ten hill lots and are tested for fertility, maturity, and virus content. Seedlings with commercial possibilities for any of the numerous quality factors, such as yield, maturity, dry matter content and disease or insect resistance in which various states are interested, are selected for further trials by and for state experiment stations.

Varietal Testing

In Maine, the preliminary testing program is conducted by Donald Folsom and Reiner Bonde, Plant Pathologists with the Maine Agricultural Experiment Station; Geddes Simpson, Entomologist with the Experiment Station; and E. S. Schultz, Pathologist with the Bureau of Plant Industry. Essentially these trials are designed to select varieties showing resistance to the more serious diseases and insect pests occurring in Maine. Resistance of seedlings to late blight, bacterial ring rot, leafroll, common scab, various mosaic complexes, and the green peach aphid are of particular concern.

Varieties showing superior qualities of resistance as compared with standard varieties now in use, and having apparent acceptable commercial qualities are then placed in the yield and adaptability trials

under the supervision of the Agronomy Department of the Maine Station. These yield-adaptability trials are conducted at six different locations in Maine on commercially operated potato farms. Although plot layout with replications and hand spacing of uniform sized seed pieces are carefully made, the plots are handled by the farmer cooperator as part of a commercial field and in his customary manner insofar as fertilization, disease and insect control measures, and cultivation are concerned. Not in all cases are cultural methods at the best possible levels, but it has been decided to subject the varieties to conditions commonly in use. Geographically these trials are run in all sections of Maine where potatoes are of major importance.

Yields are taken and specific gravity determinations are made at harvest time. The following summary tables of the 1948 trials illustrate the differences which occur from location to location within Maine.

Variety Release

In 1949 the only unnamed seedlings carried in the trials which had been grown in 1948 were N.D. K-5, B76-43, B61-3, and B294-22. It was decided by the agencies involved that the other seedlings did not have out-tanding commercial possibilities. It is planned to release only those varieties which over a three-year period show distinctly superior qualities of diseases or insect resistance and have high yielding ability and adequate quality. Certainly the emphasis will be to name only outstandingly good varieties and releases will be kept to a minimum.

Reservoir stocks of all unnamed varieties in the yield trials are maintained at Aroostook Farm. These are rogued carefully to keep the disease content of the stocks at a minimum. Once it has been decided by all concerned to name and release a variety, the reservoir stocks are taken to the Seed Board Farm at Masardis. This farm is owned by the State of Maine, and is operated primarily as a seed source farm for foundation seed growers. Five hills of each unnamed seedling in the yield trials are carried on this farm as soon as it has been decided to increase a variety for state-wide yield testing. These, too, serve as a seed reserve for potentially promising seedlings. A Seed Board composed of five seed growers appointed by the Governor of Maine is the governing group, but the day by day operation of the farm is under the direction of E. L. Newdick, Division of Plant Industry, Maine Department of Agriculture. This farm functions to maintain disease-free seed stocks of different commercial varieties as well as to increase lots of new varieties to a point where they can be sold to farmers. Release of a new variety from the Seed Board Farm is made generally to foundation

TABLE 1.—*Comparison of yield of eighteen potato varieties at six Maine locations in 1948.**

Bushel per Acre

Variety	Van Buren	Presque Isle	Houlton	Patten	Exeter	Bethel	Av. All Locations	Av. 5 Locations 1947
Ontario	642.7	464.2	445.4	800.4	642.4	601.9	599.5	570.6
Gr. Mt.	667.3	469.4	510.1	803.6	566.6	529.4	591.1	602.6
B76-43	660.2	469.1	366.9	700.7	652.5	656.9	584.4	not grown
Kennebec	654.1	443.6	444.2	758.4	555.0	612.8	578.0	674.5
Teton	604.1	413.0	439.3	715.9	616.1	534.5	553.8	604.6
Chippewa	634.2	409.8	340.9	694.4	561.0	573.0	535.6	558.4
N.D. K-5	528.4	406.9	389.3	666.6	543.5	613.5	524.7	580.9
B61-3	605.2	387.9	358.1	667.7	487.2	584.9	515.2	569.1
B294-22	578.8	375.4	328.9	667.0	516.4	565.9	505.4	not grown
Mohawk	595.3	393.4	328.0	618.2	538.3	414.9	481.4	542.3
Katahdin	547.6	331.1	333.4	649.4	456.6	499.9	469.7	520.5
Irish Cobbler	517.8	341.3	264.3	620.8	559.6	501.6	467.6	538.5
Empire	520.0	377.2	354.9	649.4	416.4	409.1	454.5	not grown
X1276-185	521.4	368.7	301.3	604.4	441.0	460.1	449.5	477.6
B301-90	497.2	366.4	271.6	660.0	471.6	421.8	448.1	not grown
B301-29	450.8	300.3	335.4	593.1	501.4	451.7	438.8	not grown
B301-43	522.0	345.6	291.1	608.9	437.0	402.7	434.6	not grown
B301-20	458.3	280.8	203.4	481.6	329.2	336.1	348.2	not grown
L. S. D. 5 per cent	57.0	33.0	94.6	66.5	115.0	77.9		

*All potatoes were planted nine inches apart in the row. Six replications, 30 hills per individual plot, fertilized with complete fertilizer furnishing a minimum per acre of 100 lbs. of nitrogen in about 2-3-4 ratio.

TABLE 2.—*Comparison of specific gravity of eighteen potato varieties grown at six Maine locations in* 1948. *Specific gravity by weight in water method.**

Variety	Van Buren	Presque Isle	Houlton	Patten	Exeter	Bethel	Average
Ontario	1.0693	1.0790	1.0714	1.0745	1.0898	1.0678	1.0753
Gr. Mt.	1.0803	1.0838	1.0858	1.0904	1.0970	1.0780	1.0860
B76-43	1.0834	1.0907	1.0796	1.0915	1.0955	1.0774	1.0864
Kennebec	1.0774	1.0861	1.0779	1.0789	1.0930	1.0712	1.0808
Teton	1.0766	1.0855	1.0759	1.0752	1.0851	1.0687	1.0778
Chippewa	1.0678	1.0802	1.0709	1.0727	1.0730	1.0633	1.0713
N.D. K-5	1.0710	1.0786	1.0716	1.0701	1.0798	1.0632	1.0724
B61-3	1.0781	1.0908	1.0778	1.0832	1.0931	1.0741	1.0829
B294-22	1.0814	1.0880	1.0828	1.0708	1.0956	1.0700	1.0813
Mohawk	1.0776	1.0859	1.0826	1.0708	1.0946	1.0731	1.0823
Katahdin	1.0727	1.0840	1.0778	1.0782	1.0857	1.0647	1.0772
Irish Cobbler	1.0784	1.0854	1.0830	1.0877	1.0801	1.0730	1.0813
Empire	1.0764	1.0811	1.0829	1.0818	1.0927	1.0739	1.0815
X1276-185	1.0729	1.0816	1.0747	1.0742	1.0788	1.0651	1.0746
B301-90	1.0693	1.0786	1.0711	1.0720	1.0760	1.0602	1.0712
B301-29	1.0688	1.0838	1.0682	1.0707	1.0811	1.0644	1.0728
B301-43	1.0764	1.0866	1.0800	1.0759	1.0823	1.0688	1.0783
B301-20	1.0710	1.0833	1.0786	1.0801	1.0833	1.0681	1.0774
Average	1.0749	1.0841	1.0774	1.0786	1.0864	1.0690	
L. S. D. 5 per cent	.0041	.0067	.0064	.0042	.0040	.0019	

*Average of six replications for each variety at each location.

seed growers first. On foundation seed farms the variety is planted by tuber unit methods and rogued by employees of the State Department of Agriculture. Finally, seed grown by foundation growers can be sold only in Maine providing a market is available. Ordinarily foundation seed is purchased by growers of certified seed.

The program of variety release is entirely self supporting with the farmers who secure stocks of a new variety paying the costs involved.

POTATO VINE KILLING IN PRINCE EDWARD ISLAND[1]

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During the past several years the elimination of potato vines by physical or chemical agencies has been progressing rapidly into the realm of common procedure. Many chemicals and machines have been developed for the specific purpose of destroying the vines prior to harvesting the crop. Experiments have been and are being conducted in many regions, and a few papers have appeared. This recent and intense interest in vine killing almost deludes us into believing that the idea is a modern one, but if we examine the literature we shall find that its roots go back to a great many years. We have, in this present decade, merely revived and developed some facts and ideas of rather ancient vintage. In 1887 Jensen (6) suggested that the crop be left in the ground until two weeks after the stalks were dead so as to reduce infection from contact of the tubers with partially blighted foliage. The results of his experiments and observations were substantiated on this continent by Jones and Morse (8), whose work has been summarized by Jones, Giddings and Lutman (7). Clinton (3) observed that outbreaks of rot usually followed slight but long drawn-out attacks of late blight, and that losses were negligible in seasons when severe epiphytotics brought about an early and complete death of the vines. Other early authors such as Stewart (12) and Osmun (10) have recorded similar experiences.

During the period 1916-1919 a very considerable amount of in-

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vestigational work was conducted at that which was then known as the Plant Pathological Field Station at Charlottetown, Prince Edward Island, by Paul A. Murphy, who later continued his studies in Ireland. The results of his experiments were published in an excellent paper in 1921 (9). A brief review of his findings and suggestions will provide us with an interesting historical background to the subject and perhaps make us realize that we have ignored some very valuable information for two decades. Murphy reported that the following conclusions seemed justifiable:

1. The danger of late blight rot originating from the foliage and surface soil during digging is greater than that occurring while the potatoes are in the ground.

2. The surface soil is a more serious source of infection at harvest-time than partly blighted foliage.

3. Infection may be caused by the soil certainly nine days after the stalks are removed, and probably longer, but not thirty-four days afterwards. The exact time was not determined.

4. Rot is reduced considerably by the removal of the foliage a sufficient period (probably not less than two weeks) before harvesting.

In a consideration of the practical applications of his findings Murphy made some very poignant statements and these have formed the bases of our later work. He pointed out, "That where blight breaks out late in the season on potatoes which were previously healthy, and where it is believed the tubers are still free from infection, there are good indications that the safest course to follow is to remove the stalks and not to dig the crop until at least two weeks later. This practice is new and it is desirable that experimentalists, and growers who have trouble with rot, should give it a trial on a small scale in conjunction with the best spraying possible. It is possible to cut off the stalks with a mower and then rake them off the field. It is believed that a better way would be to spray the plants with a poisonous chemical in order to reduce the danger of shaking down conidia from the leaves and disturbing the soil. The spraying method has not been tried but it will probably be found that the formula recommended for killing wild mustard will be found effective, that is, 10 pounds of copper sulphate in 40 gallons of water. It has been found that the foliage of potato and wild mustard react similarly to several chemicals, for instance to 15 per cent solutions of magnesium chloride, nitrate of soda, and potassium chloride. It is probable that a little ingenuity would discover better chemicals than these, among which might be suggested

bleaching powder or soluble arsenic compounds like sodium arsenite which are used as commercial weed-killers."

The seed that Murphy sowed was not entirely lost, and in Prince Edward Island it was not unusual, in a year with a prolonged growing season, to see a farmer "burning off the tops" by spraying them with a concentrated solution of copper sulphate in order to facilitate digging operations. However, although the practice was recognized as excellent, little or no attention was directed to it, and no definite investigational work was undertaken until 1941, when some preliminary tests were carried out. The possibility of using certain common chemicals such as ammonium nitrate, sodium nitrate, ammonium sulphate, cupric sulphate, and sulphuric acid was investigated (1). Each of these has been discarded because of certain undesirable features. Sulphuric acid is without doubt a very quick and efficient vine killer, but because of its great chemical activity it is dangerous to use and special equipment must be employed to make the applications. It was found necessary, then, to search for more suitable chemicals.

Some farmers in Prince Edward Island were adding a small quantity of Handy Killer, a concentrated solution of sodium arsenite, to Bordeaux mixture for the purpose of controlling the Colorado Potato Beetle. It was known that serious burning of the foliage would result if this chemical was applied alone or with a neutral fungicide. It was found that a satisfactory but slow destruction of the foliage could be obtained with this chemical and it soon became, under various trade names, a widely used vine killer. In Prince Edward Island, where it is now almost the only type of vine killer used, two quarts in eighty gallons has been found satisfactory for killing maturing vines, but it is recommended that the sprayer be driven both up and down the rows to assure maximum coverage. Higher concentrations are needed when young vigorous vines are to be eliminated. Recent greenhouse and field tests (2) have shown that the inclusion of a suitable oil in the sodium arsenite spray increases the rate of its killing action, but results have been variable. In 1947 excellent kills were effected when the vines were sprayed with a mixture containing two quarts of a sodium arsenite vine killer and four gallons of waste crankcase oil in eighty gallons of water. The spray was prepared by stirring the arsenical and oil together, adding the resulting mixture to the sprayer tank, and finally adding the water while the agitators were turning. This method of mixing emulsified most of the oil. This mixture killed the vines much more rapidly than similar concentration of sodium arsenite without oil, and killing rates were comparable to those effected

by Dowspray 66 Improved (1 gal. — 80) and Sinox General (1 qt. + 3 gal. oil — 80).

In 1948 three preparations of sodium arsenite were compared: 2 qts. — 80, 2 qts. + 10 lbs. sodium chloride — 80, 2 qts. + 4 gals. waste crankcase oil — 80. The plants in plots treated with the salt mixture were the first to show a reaction, but later the differences in killing rates were not great, the oil mixture not showing the outstanding superior effectiveness observed in 1947. The salt mixture was slightly better than the sodium arsenite alone.

Three preparations of Dowspray 66 Improved were also tested in 1948: 1 gal. — 80, 1 gal. + 2 lbs. aluminum sulphate — 80, 2 gals. — 80. Here again differences in killing rates were not great. The aluminum sulphate made a slight difference in the effectiveness of the chemical, but the use of an additional gallon of Dowspray 66 was not justified by the results. In 1947 two gallons of Dowspray were greatly superior to one. A ten per cent mixture of the British vine killer Lotemcide was very effective. Plants sprayed with this material wilted and blackened almost immediately and in forty-eight hours all the leaves and almost all the stems were dead. It was evident that a lower concentration would be satisfactory.

In 1948 the plants were approximately the same age and the sprays were applied on almost the same date as in 1947. The only observed variable factor was the weather. Weather data for the periods of vine killing are presented in table 1, in which it is indicated that the period in 1948 was characterized by lower temperatures, less sunshine, higher humidity, and greater precipitation. This cool, cloudy and damp weather probably slowed down the killing action of the vine killers, and tended to lessen the differences in their killing rates. During the eight years that we have been studying vine killing we have observed that the plants are killed down much quicker when the period is sunny and hot.

The artificial destruction of potato vines has introduced a new problem: the premature killing of vines may induce a stem-end browning and vascular discoloration of tubers. This phenomenon has not been observed in Britain (14), where chemical vine killing has been practiced for many years, but it is regarded in a serious light in some regions on this continent. In 1946, when vine killing was first used on a large scale in British Columbia, from 50 to 100 per cent of the tubers from treated fields developed vascular discoloration (1). The growers, who had treated about 1000 acres were greatly worried because they feared that their potatoes would not be accepted on their

TABLE 1.—*Weather data for 1947 and 1948 periods of vine killing*

		1st Day	2nd Day	3rd Day	4th Day	5th Day	6th Day	7th Day	Mean
Min. Temp.	1947	48	57	62	68	55	63	66	59.9
	1948	61	59	58	60	60	50	44	56.0
Max. Temp.	1947	68	66	83	86	80	67	74	74.9
	1948	77	69	72	77	67	60	60	68.8
Hours Sun	1947	10.4	8.3	8.7	9.6	9.6	10.3	5.5	9.4
	1948	2.0	0.0	5.0	8.5	9.6	8.8	0.0	4.8
Rel. Humidity	1947	67	71	83	82	79	81	81	77.7
	1948	89	87	72	74	74	73	83	79.3
Precipitation	1947	0.03	—	—	—	—	0.14	—	—
	1948	trace	trace	trace	—	—	0.16	0.33	—

seed market in the Pacific Coast States. In Ontario, likewise, pronounced stem-end browning was found associated with the treatments (1).

When these reports from our sister provinces were brought to our notice, we decided to direct some attention to a study of the effects of vine killing on the tubers. Some progress has been made but it is still not possible to present a clarified explanation for this unfortunate phenomenon. It is likely, however, that more than one predisposing factor plays a part in inducing the condition. These factors may include: (1) the rapidity of the kill, (2) the type of chemical used, (3) the character of the season, and (4) the age of the plants.

Hoyman (4, 5) reported that tuber discoloration was positively correlated with the rapidity of the kill under the conditions of his experiments in North Dakota. Richardson (11) has made similar observations in Ontario; and in British Columbia, where induced tuber vascular necrosis was abundant and severe in 1946, it was noted that in fields where the vines were killed slowly the amount of discoloration was no greater than normal (1). The experiments in Prince Edward Island have consistently indicated that the rapidity of the kill is one factor in inducing tuber vascular discoloration. It is a recognized fact that a quick-killing frost may induce the condition, and our tests have shown that tubers from plants whose vines have been mechanically cut off at ground level exhibit a much greater incidence of stem-end browning than tubers from untreated check plants, or from plants destroyed by slow-acting herbicides.

Vine killers in which the active principle is a dinitro compound have always shown a considerable propensity to induce tuber vascular discoloration in the tests conducted in Prince Edward Island. Steinbauer (13) has observed a similar tendency, and Hoyman (4) has reported a brown discoloration of the vascular tissue two days following the application of Dowspray 66 Improved (dinitro ortho secondary butyl phenol). This chemical was selected for some special studies.

In the winter of 1947-1948 green-sprouted sets of the variety Green Mountain were planted in 8-inch pots on the 5th of January, and treatments were begun on the 23rd of February—fifty days later. Treatments and results were as follows:

Treatment 1. One leaf was held for one minute in a 1-25 dilution of Dowspray 66 Improved, a different leaf being treated each day. It was observed that the stems weakened and split at the point of attachment of the petioles of treated leaves, causing the plants to wilt and fall over. After four treatments the plants, which were not large,

TABLE 2.—*Percentage of tubers showing prominent discoloration in vine killing tests,* 1948

Chemical	Concentration per 80 Gallons	After 14 Days	After Six Weeks in Storage
Check	———	1	6
Sodium arsenate	2 qt.	8	17
Sodium arsenite + oil[1]	2 qt. + 4 gal.	12	19
Sodium arsenate + salt	2 qt. + 10 lb.	17	29
Dowspray 66	1 gal.	8	28
Dowspray 66 + aluminum sulphate	1 gal. + 2 lb.	6	35
Dowspray 66	2 gal.	18	41
Lotemcide	8 gal.	16	56
Tops cut off	———	11	40

[1]Waste crankcase oil.

were all prostrate and nearly dead, death occurring in seven days. The tubers were harvested, brushed clean, and examined on the 1st of March. Stem-end browning was severe in 14.8 per cent of the tubers.

Treatment 2. One cubic centimeter of Dowspray 66 Improved was distributed over the soil surface in each pot and the plants were watered immediately. The treatment was repeated on each of the succeeding three days. On the third day the veins of the leaves were darker than normal and chlorosis was apparent in the leaf tissue along the main vein. The chlorotic areas progressed rapidly out along the lateral veins, the plants wilted, and on the fourth day all the plants lay prostrate. On the seventh day 50 per cent of the plants were dead. The entire vascular ring was discolored in 92 per cent of the tubers.

Treatment 3. Three cubic centimetere of the chemical were applied to the surface soil in one application, and the plots were watered immediately. The symptoms were similar to those described under treatment 2. The entire vascular ring was discolored in 100 per cent of the tubers.

Treatment 4. Absorbent cotton was packed on the soil and held in place by means of a waxed cardboard disk; the plants were inverted in a 1-40 dilution of the chemical, allowed to drain, and replaced on the benches. This method prevented any of the chemical from reaching the soil. The plants were watered every day until they were dead. The effects of the treatment were visible at once, and within one hour the leaves were soft and black and all plants were prostrate.

Death was complete on the third day. Stem-end browning was severe in 34.5 per cent of the tubers.

Treatment 5. The method employed here was similar to that of treatment 4 but the plants were not watered for three days before the treatment or afterwards. At the end of one hour the plants showed almost no effects and death was not complete until the fourth day. Stem-end browning was severe in 77.4 per cent of the tubers, the percentage being more than double that recorded for the tubers of treatment 4. It was indicated, therefore, that stem-end discoloration induced by vine killing is favored by drought.

Treatment 6. These plants were allowed to die for lack of water. Stem-end browning was severe in 7.4 per cent of the tubers.

Treatment 7. The plants were kept watered and healthy until harvested on the 1st of March. Stem-end browning was severe in 4.0 per cent of the tubers.

Some of these treatments were studied under field conditions during the past summer. the treatments being: (1) one leaf dipped daily in a 1-25 dilution of Dowspray 66 Improved. A treatment was of ten seconds' duration; (2) One cubic centimeter of the commercial chemical applied to the soil under each plant; (3) Three cubic centimeters per plant applied to the soil; (4) Five cubic centimeters per plant applied to the soil; and (5) No treatment. The plots, of Green Mouutains, were planted on the 26th of May and two plots of fifty plants each were used for each treatment. The plants were large and vigorous when the leaf treatments were begun on the 24th of August and the severe effects observed on the much smaller greenhouse plants were not apparent. From the 24th of August to the 23rd of September eighteen leaf treatments were made but only 17 per cent of the plants were killed. The soil treatments were made on the 2d of September. No effects of the soil treatments were visible on the foliage. The plots were dug on the 28th of September and the tubers were examined at once. The percentage of severe stem-end browning in the tubers was as follows: Check, 0.0; leaf treatment, 6.0; 1 cc. on soil, 6.0; 3 cc. on soil, 7.0; and 5 cc. on soil, 10.0.

In a test conducted in 1947 (2) it was shown that the amount and intensity of discoloration in tubers from plots killed at different stages of development with Dowspray 66 Improved increased uniformly with the age of the plants. Replicated plots were killed on the 11th and 27th of August, the 8th and 22nd of September, and the percentage of tubers showing prominent stem-end browning was 3.3, 21.3, 36.0 and 43.0, respectively.

During the past season two tests were carried out to study the effect on the tubers of killing plants at different ages. One series of replicated plots was planted on the 19th of May and the chemical was applied 70, 85, 100, and 115 days after planting. In the other series the plots were planted at 15-day intervals beginning on the same date. All plants in this second series were killed on the same day, that of the last killing in the first series. Consequently, the plants in the second series were also killed 70, 85, 100, and 115 days after planting. The variety Green Mountain was used. Two gallons of Dowspray 66 Improved in eighty gallons of water were used for all applications. The spray was delivered at a pressure of 325 pounds; the machine was equipped with four nozzles per row and driven both ways of the rows so that rather heavy applications were made. One hundred tubers from each plot were examined by removing one or more thin slices from the stolen end fifteen days after each application. It was quite obvious in both experiments that stem-end discoloration increased as the plants approached maturity as is shown in table 3.

Summary

1. The killing of potato vines prior to harvesting the crop has been widely practiced in recent years but the theory goes back many years. In 1887 Jensen, working in Europe, suggested leaving the crop in the ground until two weeks after the tops were dead as a sanitary measure against late blight tuber rot, and his theories were substantiated by the experiments of several workers on this continent early in the present century. Paul A. Murphy, working in Prince Edward Island during the First World War, proposed cutting and removing the vines or spraying the plants with chemicals such as cupric sulphate or sodium arsenite.

2. Sodium arsenite kills the plants slowly, but the addition of a suitable oil such as waste crankcase oil results in a more effective spray. The addition of common salt (sodium chloride) also increases the phytotoxicity of sodium arsenite vine killers.

3. A new British product, Lotemcide, gave a very rapid and complete destruction of the foliage when used at a concentration of 10 per cent. A lower concentration would be satisfactory.

4. A discoloration at the stem end and in the vascular system of tubers may be induced by killing the vines.

5. The factor or combination of factors that may be correlated with the discoloration has not been determined satisfactorily. It is probable that more than one factor plays a part in inducing the condi-

TABLE 3.—*Amount and intensity of discoloration in tubers from plants killed at different ages with dinitro ortho secondary butyl phenol,* 1948.

Method	Age When Killed (Days	Per cent Free	Per cent Incipient	Per cent Moderate	Per cent Severe	Rating
Planted at 15-day Intervals	70	7	38	44	11	12.6
	85	1	9	58	32	16.0
	100	1	8	51	40	16.4
	115	0	1	49	50	17.4
Killed at 15-day Intervals	70	12	43	30	15	11.8
	85	3	19	43	35	15.3
	100	1	2	48	49	17.2
	115	0	1	44	55	17.7

tion. These factors may include: (1) the rapidity of the kill, (2) the type of chemical used, (3) the character of the season, (4) the age of the plants.

6. In Prince Edward Island it has been observed that tuber discoloration is correlated with the rapidity of the kill.

7. Tubers harvested from untreated cut vines have shown a greater amount of stem-end browning than tubers from untreated check plants, or from plants killed by slower-acting chemical vine killers.

8. Vine killers in which the active principle is a dinitro compound have shown a considerable propensity to induce tuber vascular discoloration.

9. The amount of moisture available to the plants may affect the amount of tuber discoloration, the tubers from plants killed under drought conditions exhibiting the greatest injury in greenhouse tests.

10. Experiments conducted during the past two seasons have indicated that the amount and intensity of discoloration in tubers from plants killed at different stages of development with dintro or the secondary butyl phenol increases uniformly with the age of the plants.

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SECTIONAL NOTES

Colorado

Colorado has a big crop again this year. The acreage in 1949 was considerably less than last year, but in general the yields have been high. It is difficult to write about potato yields for Colorado without reminiscing into the past year, or reflecting what has happened over the years. The average acreage for the state from 1928 to 1932 was 104,000. The average production for the state during those years was 14,500,000 bushels, or an average per acre yield of 149 bushels. In 1949, the estimated acreage planted is 67,000, and the total yield is in excess of 16,000,000 bushels, or an average per acre yield of 240 bushels or more. The weather during harvest has been much more favorable than it was at planting time. During the latter part of May and the first half of June, Nature bestowed upon us more rainfall than we usually experience during six months' time. This had a double effect in that it prevented the early crop from being cultivated and sprayed, and it also prevented the late crop from being planted until quite late. Along with too much rain early, there was a severe infestation of psyllids. The psyllid is a small insect common to the areas of low rainfall, and which, when occurring in large numbers, can make all the other potato insects appear as "sissies" from the standpoint of damage done. These insects, by their feeding, inject a poison into the vines, with the result that tubers either fail to form, may form a string of tubers on a single stolen, or may be so malformed that the potatoes are not worth digging. Some few fields in Colorado were so badly damaged that harvesting was discontinued. The answer to these pests is DDT or sulphur, or both. Some years ago it was discovered that sulphur dust or lime sulphur spray, acting as a repellent, would control psyllids, and since the development of DDT, the psyllid has quite largely ceased to be a serious problem. However, this year there was an extra heavy infestation, and had it not been for DDT, it is questionable whether or not there would have been any potatoes in Colorado.

Nature made up for the late planting by not producing a killing frost in most of Colorado until the 11th of October, which is an unusually late date for even the lower elevations. Consequently, the average yield for the late crop has been high. There were, on the irrigated lands, many yields of more than three hundred sacks (one hundred pound sacks) per acre, several yields of four hundred sacks, and one or two yields of five hundred sacks or more. In general, the quality is good throughout most of the state. There was a small amount of field frost during the

latter part of harvesting, but the percentage of field frost is much smaller that a year ago.

There were 6,200 acres of all varieties entered for certification this year. All the field and bin inspections are completed and the winter test samples have been collected. These samples are planted about the 15th of December, at Brownville, Texas. Disease readings are made some time in February. Winter testing is compulsory in Colorado if tags are to be issued, or if the seed is to be recertified.—CECIL W. FRUTCHEY.

MAINE

The following paragraphs taken from a local news bulletin says: "Haulings and offerings from the growers are very light. Street price bulk barrel measure from the growers continues too high and the dealers are unable to sell for prices high enough to pay their operating costs. Therefore, many warehouses remain closed and growers will not start selling freely until after the first of the year when support prices are higher. Some potato men are concerned about the light daily shipment out of Maine. Of course, this could increase quickly if the prices advance to about January support levels.

The Certified Seed demand is showing some improvement and we have sold more seed in the last few days than for several weeks.

The Marketing Committee of the Production Marketing Administration met again and changed their recommendation to the Secretary. They now recommend a size specification on table stock from Maine for the balance of the season of 2" minimum to 4" maximum, with the B's and those over 4" withheld from the markets.

All starch factories in Aroostook County are now doing business and will take care of these B's, culls, and over-size potatoes."

The potatoes are apparently coming out very good. There is relatively little shrinkage and there are not so many over-sized potatoes as we thought there would be. Maine's yield of 425 bushels sets an all-time high. Shipments this year have reached 3771 cars, of which only 55 were government purchases. Last year at the same time Maine had shipped 6743 cars, of which 5474 cars were government purchases. Certified Cobblers are being quoted at $3.00 per cwt. F.O.B. Presque Isle for February delivery; Certified Katahdins and Chippewas about $2.45.—VERNE C. BEVERLY.

NEBRASKA NOTES

The harvesting of late main crop potatoes in Nebraska was practically completed by the 15th of October, with a few stragglers still in op-

eration the following week. As a whole, the harvesting period was quite satisfactory from the weather standpoint, although parts of the territory had heavy rains, which accounted for delays for some growers. Light frosts prior to harvest, killed the vines and matured the tubers, so that there was little difficulty with cracking, as is generally the case with the Triumph variety. In addition to the maturity of the potatoes, the prevalence of scab was much lighter than usual, resulting in the general improvement of quality as compared with previous seasons. Shippers and growers alike report that the percentage of U. S. No. 1 grade is highly satisfactory through most of western Nebraska.

The final tuber inspection of Certified potatoes confirms the opinion of shippers and growers. This inspection is about completed at this writing, and indicates a larger tonnage of Blue Tag quality than in 1948, despite a reduction in total tonnage.

The reduction in total tonnage is accounted for by an extremely early frost in parts of western Nebraska, and an early blight epidemic that knocked down the vines a week or ten days earlier than usual.

Referring to the notes from Nebraska during the summer, it will be observed that psyllid yellows was the most serious problem encountered. This insect trouble is manifested by an abortive growth of the vine, excessive set and mal-formed tubers. The effect on the tubers can be observed in examination of the harvested product. Fortunately, this trouble does not affect the seed quality or the following crop. The reduction in yield, of course, is quite apparent in some cases.

Shipments of table stock have been light up to this time. Growers are apathetic, as they feel prices are too low. Certified seed shipments are just beginning, the earliest going to the Rio Grande Valley of Texas. This heaviest movement to the deep south usually comes after the first of the year.—MARX KOEHNKE.

OREGON

Harvesting operations have been completed. Approximately 1400 acres—Russets 929; White Rose 485—met seed certification requirements. The insect population was very light and as a result the seed was of excellent quality. The local potato association program of using better seed, dusting or spraying for insect control, planting only on clean and built-up soil, and careful field examination throughout the year have apparently been very instrumental in seed improvement.

The commercial potato crop came out fairly well even though extremely heavy frosts occurred in early summer and late spring. The yield

will be considerably below that of 1948 and the percentage of number 1's will be a little less. In general, however, growers are quite well satisfied with the outcome, a late fall season has helped tremendously. —C. A. HENDERSON.

A total of 924 acres of Russets (Netted Gems) and 450 acres of White Rose have met all certification requirements to date. This acreage will produce approximately 350,000 sacks of certified seed. However, this entire tonnage may not go for certified seed, inasmuch as the bakers may be taken out and sold commercially on several large lots of Russets.

The marketing agreement in effect here seems to be working out in good shape and growers of central Oregon and northern California (Tulelake District) approved it by an overwhelming vote. This is the second year of active operation of the Central Oregon and Northern California Marketing Agreement and growers are finding it most helpful to them.—C. A. HENDERSON.

DOMINION OF CANADA

The 1949 potato crop in Canada is estimated at approximately 82 million bushels. This is a reduction of approximately 10 million bushels from that produced in 1948. No estimate has been made of the amount of certified seed produced but it is expected that it will be somewhat in excess of 13 million bushels. 65,000 acres of all varieties passed field inspection in 1949 as compared with 57,000 in 1948. This is the highest acreage passed on record. The entire crop has been harvested and the yields in most places are reasonably good. In Prince Edward Island the yields are higher than they were last year, whereas in some of the other provinces the yields are the same or slightly less than those obtained in 1948. Large quantities of certified seed are moving to foreign countries by rail and boat. The first car-lot shipment of the new variety 'Canus' moved from Manitoba to British Columbia in October. The variety produces a high percentage of medium-sized marketable tubers which have an attractive skin. There has been an excellent demand for the Pontiac variety this year and it is expected that more will be grown in 1950.—J. W. SCANNELL.

PROGRAM OF THE ANNUAL MEETING OF THE POTATO ASSOCIATION OF AMERICA

December 7, 8, 9, 1949

HOTEL PHILLIPS

KANSAS CITY, MISSOURI

President, O. D. BURKE, Pennslyvania State College, State College, Pa.

Wednesday Morning, December 7, Hotel Phillips (see bulletin board for room number) 9:30 A. M.

A. G. TOLAAS, *Presiding*

1. *The Spread of Potato Virus X by the Cutting Knife* R. H. LARSON, University of Wisconsin, Madison, Wis.
2. *Physiological Internal Tuber Necrosis—Reaction of Potato Varieties* R. H. LARSON, University of Wisconsin, Madison, Wis.
3. *Field Tests of Some New Potato Fungicides* J. H. MUNCIE, Michigan State College, East Lansing, Mich.
4. *The Tolerance of Potato Foliage to Zinc* WM. G. HOYMAN, North Dakota Agricultural Experiment Station, Fargo, N. D.
5. *The Expression of Leaf Roll Symptoms in the Potato as Influenced by Plant Nutrients* H. M. DARLING and K. C. BERGER, University of Wisconsin, Madison, Wis.
6. *A Study of Factors Influencing Symptomatology of Bacterial Ringrot of Potato and Distribution of the Pathogene through the Host* ARDEN F. SHERF, University of Nebraska, Lincoln, Nebr.
7. *Potato Aphid Control Studies, 1946-1949, Woodstock, New Brunswick* J. B. ADAMS and R. A. KELLEY, Dominion Entomological Laboratory, Fredericton, N. B. Canada,

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Wednesday Afternoon, December 7, Hotel Phillips (see bulletin board for room number) 1:30 P. M.

J. W. SCANNELL, *Presiding*

1. *Potato Insect Control and Tuber Yield in North Dakota* R. L. POST, R. W. McCALLEY and J. A. MUNRO, North Dakota Agricultural Experiment Station and State Seed Department, Fargo, N. D.
2. *New Insecticides for Wireworm Control* A. C. DAVIS and W. A. RAWLINS, Cornell University, Ithaca, N. Y.
3. *Flavor in Potatoes as Influenced by Organic Insecticides* W. A. MACLINN, J. P. REED, B. B. PEPPER and J. C. CAMPBELL, Rutgers University, New Brunswick, N. J.
4. *Performance of Potato Varieties in Pennsylvania in 1949* O. D. BURKE and W. R. MILLS, Pennsylvania State College, State College, Pa.

5. *Procedure for the Introduction of New Varieties of Potatoes in Canada* N. M. PARKS, Division of Horticulture, Experiment Farm Service, Ottawa, Canada.
6. *Effect of Water Submersion on the Seed Value of Potato Tubers* E. V. HARDENBURG, Cornell University, Ithaca, N. Y.
7. *A Field Test of Plastic Electrodes to Determine the Need for Irrigation* A. J. PRATT and JOHN LAMB, JR., Cornell University and U. S. D. A. Soil Conservation Service, Ithaca, N. Y.

Thursday Morning, December 8, Hotel Phillips (see bulletin board for room number) 9:00 A. M.

O. D. BURKE, *Presiding*

Business Meeting
Report of Secretary
Report of Treasurer
Report of Editor, American Potato Journal
Committee Reports
New Business
Election of Officers

1. *Effect of Field and Storage Application of Sprout Inhibitors on Potato Tubers* E. R. MARSHALL and ORA SMITH, Cornell University, Ithaca, N. Y.
2. *Observations on Vascular Discoloration in Potatoes as a Result of Vine Destruction* M. W. MEADOWS and ORA SMITH, Cornell University, Ithaca, N. Y.
3. *The Use of Sulfur in Controlling Potato Scab in Iowa Peat Soils* W. J. HOOKER, Iowa State College, Ames, Iowa
4. *A Technique for Observing Tuber Formation and Scab Development in Potatoes* W. J. HOOKER, Iowa State College, Ames, Iowa.

Thursday Afternoon, December 8, Hotel President or Hotel Phillips (see bulletin board for room number) 1:30 P. M.

Joint Session, International Crop Improvement Association and Potato Association of America

H. M. DARLING, *Presiding*

See Certification Problems

Thursday Evening, December 8, Hotel Phillips (see bulletin board for room number) 7:30 P. M.

O. D. BURKE, *Presiding*

Smoker, social hour, movies, etc.
Report of Committee on Visual Education
GORDON A. BRANDES, *Chairman*

Friday Morning, December 9, Hotel Phillips (see bulletin board for room number) 9:00 A. M.

ARTHUR HAWKINS, *Presiding*

1. *Composition and Utilization of Potato Flour* R. H. TREADWAY and C. O. WILLITS, Eastern Regional Research Laboratory, U. S. D. A., Philadelphia, Pa.
2. *Chipping Quality of Several Varieties of Potatoes After Storage* J. S. COBB, Pennsylvania State College, State College, Pa.
3. *The Yield and Quality of Potato Varieties as Influenced by Irrigation, Date of Planting and Straw Mulch* A. J. PRATT and JOHN LAMB, JR., Cornell University and U. S. D. A. Soil Conservation Service, Ithaca, N. Y.
4. *Response of Potatoes to Sidedress Applications of Nitrogen Fertilizer in Connecticut in* 1949 ARTHUR HAWKINS, University of Connecticut, Storrs, Conn.
5. *Relation of Chemical Weed Control in Potatoes to Other Production Factors* ORA SMITH, M. W. MEADOWS and E. R. MARSHALL, Cornell University, Ithaca, N. Y.
6. *Chemical Weed Control in Potatoes* ORA SMITH, E. R. MARSHALL and M. W. MEADOWS, Cornell University, Ithaca, N. Y.
7. *Weed Control in Potatoes by Cultivation, Flame and Various Chemicals* SOLOMON COOK, Cornell University, Ithaca, N. Y.